UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,524	03/09/2004	Ming-Hsiu Lee	11862-US-PA	2523

31561 7590 09/09/2004

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER	
DANG, TRUNG Q	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/708,524	LEE, MING-HSIU	
	Examiner	Art Unit	
	Trung Dang	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 18-32 is/are allowed.

6)☒ Claim(s) 1-5,7-14,16 and 17 is/are rejected.

7)☒ Claim(s) 6 and 15 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5, 7-13, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Inumiya et al. (U.S. Pat. 6,251,763).

With reference to Figs. 6A-6H, the reference teaches every limitation of the claims in that it discloses a method for fabricating a contact, comprising the steps of:

providing a substrate (11);

forming a patterned first material layer (14) over the substrate, wherein the first material layer is fabricated from a first conductive material of poly-silicon (Fig. 6A and col. 11, lines 30-35);

performing an oxidation process to transform a portion of the first material layer into a second material layer (15) of silicon oxide with insulating

properties, wherein the second material layer is formed on sidewall sections and a top section of the first material layer (Fig. 6B and col. 11, lines 42-45);

forming a dielectric layer (18) over the second material layer and the substrate; and

removing a portion of the dielectric layer and the second material layer (15) to expose the first material layer (14) (Fig. 6C and related text).

For claims 2, 10, see Fig. 6D, 6G, and related text for the claimed limitation concerning the removal of the first material layer (14) to form a contact opening and then depositing a second conductive material (20) into the contact opening to form a contact.

For claims 4, 5, 16, 17, see Fig. 8C and col. 16, lines 65-67 for the nitridation of the pattern polysilicon (64). Also, oxidation and nitridation is a chemical reaction in which the speed of the reaction is limited by a diffusion mechanism as the thickness of the grown oxide or the nitride becomes large.

For claim 7, the silicon oxide (15) is an insulating material and has properties different from polysilicon (14).

For claim 13, amorphous silicon material (col. 11, lines 30-31) is considered a non-conductive material.

3. Claims 1, 3-5, 7-9, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsu (U.S. Pat. 5,432,128).

With reference to Figs. 3a-3f, the reference teaches every limitation of the claims in that it discloses a method for fabricating a contact, comprising the steps of:

providing a substrate (12);

forming a patterned first material layer (16) over the substrate, wherein the first material layer includes Al, Cu (see TABLE 1)

performing an oxidation or a nitridation process to transform a portion of the first material layer into a second material layer (18) of Al_2O_3 or AlN with insulating properties (col.4, lines 43-49), wherein the second material layer is formed on sidewall sections and a top section of the first material layer (Fig. 3a);

forming a dielectric layer (20) over the second material layer and the substrate; and

removing a portion of the dielectric layer and the second material layer (18) to expose the first material layer (16) (Fig. 3f and related text).

For claims 4, 5, 16, 17, oxidation and nitridation is a chemical reaction in which the speed of the reaction is limited by a diffusion mechanism as the thickness of the grown oxide or the nitride becomes large.

4. Claims 7, 10, 13, 14, and 16 are rejected under 35 U.S.C. 102(e) as being anticipate by Inai et al. (US 2003/0129818 A1).

With reference to Figs. 1A-1H, the reference teaches every limitation of the claims in that it discloses a method for fabricating a contact, comprising the steps of:

providing a substrate (1);

forming a patterned first material layer (2) of a positive photosensitive resin over the substrate (Fig. 1A and paragraph [0044]);

performing treatment process to transform a portion of the first material layer into a second material layer (4) with insulating properties, wherein the second material layer is formed on sidewall sections and a top section of the first material layer and the second material layer has properties different from the first material layer (Fig. 1B and paragraph [0045]);

forming a dielectric layer (3) over the second material layer and the substrate (Fig. 1B); and

removing a portion of the dielectric layer and the second material layer (4) to expose the first material layer (2) (Fig. 1C).

Noted that, since the step performing a treatment process and the step forming a dielectric layer of claim 7 do not limit to two distinct steps, the step forming a negative photosensitive resin layer 3 followed by a heat treatment to form mixed layer 4 as shown in Fig. 1B read on the limitations as claimed. Also, see

paragraph [0048] for the limitation concerning the second material layer (4) has properties different from the first material layer (2).

For claim 10, see Fig. 1G with metal layer 12 deposited in the contact opening.

For claim 14, photosensitive resin is a polymer material.

For claim 16, intermixing between a positive photosensitive resin and a negative photosensitive resin to form layer 4 is a chemical reaction.

Allowable Subject Matter

5. Claims 6 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

Claims 6 and 15 are allowable over prior art of record because the prior art does not teach or suggest the deposition of a chalcogenide material in the contact opening as claimed.

7. Claims 18-32 are allowed.

8. The following is an examiner's statement of reasons for allowance:

Claims 18-32 are allowed over prior art of record because the prior art does not teach or suggest the process as claimed, which includes: providing the linear stack structure comprises a bottom conductive layer and a top first material layer, forming at least one linear conductive layer (or linear sacrificial layer as in claim 23) over the linear stack structure in a direction perpendicular to the linear stack structure and then removing the first material layer not covered by the linear conductive layer to expose the conductive layer.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Dang whose telephone number is 571-272-1857. The examiner can normally be reached on Mon-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Trung Dang
Primary Examiner
Art Unit 2823

9/06/04